PC-HELPER

High Speed & Function IEEE-488.2 I/F Board for CardBus

GP-IB(CB)F

High Speed IEEE-488.2 I/F Board for CardBus

GP-IB(CB)FL

User's Manual

CONTEC CO.,LTD.

Check Your Package

Thank you for purchasing the CONTEC product.

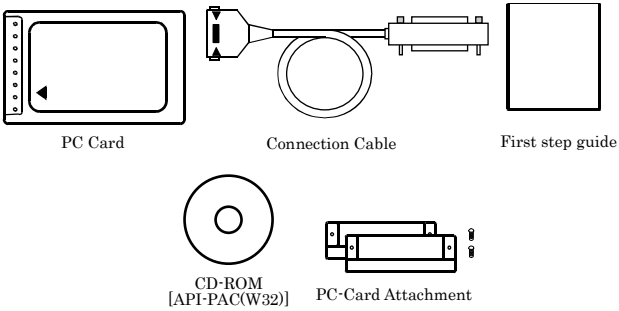
The product consists of the items listed below.

Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List

- PC Card(One of the following)
  [GP-IB(CB)F or GP-IB(CB)FL] …1
- First step guide …1
- CD-ROM *1 [API-PAC(W32)] …1
- Connection Cable (CB-GPIB) …1
- PC-Card Attachment(CARD-AT1) …1set

*1 The CD-ROM contains the driver software and User's Guide (this guide)



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1. Before Using the Product

About the PC Card

This PC card is a multi-function, high-speed GPIB communication card that complies with IEEE-488.1 and IEEE-488.2. The card is a PC Card Standard compliant CardBus card with support for bus master operation. The card can be used to control communications with devices that support the GPIB interface and perform GPIB bus line data analysis on any PC that has a PC Card Standard compliant CardBus Type II PC card slot.
You can use the supplied driver library to develop application software using any programming language that supports the Win32 API routines (such as Visual Basic or Visual C++), or using LabVIEW.

Features

Complies with the IEEE-488.2 standard

- As the card complies with the IEEE-488.2 standard, you can control any external device that supports this standard.

Data transfer speed 1.5Mbyte/sec max.

- The maximum data transfer speed for communications is 1.5Mbyte/sec.

Supports bus master operation

- The bus master data transfer function enables large quantities of data to be transferred between the PC Card and PC without loading the CPU.

Internal 2Kbyte FIFO buffers for send and receive

- The PC Card has separate 2Kbyte FIFO buffers for sending and receiving data, allowing both small and large volumes of data to be transferred at high speed.
- Interface messages also use a FIFO to enable high-speed transmission.

Built-in GPIB bus analyzer function [GP-IB(CB)F]

- The PC Card features a bus analyzer function.
  This not only allows the signals on the GPIB bus to analyzed, but also permits signal analysis to be performed while the PC card is performing GPIB communications

Built-in SPAS event function

- In addition to the functions of the earlier GPIB controller (μPD7210), the PC Card also supports the SPAS event generated when a serial poll occurs. This gives you a high level of flexibility in constructing your system.

Internal high-precision timer

- The PC Card includes a high-precision application timer to allow accurate time monitoring to be performed from Windows.

Long term availability

- As the PC Card uses a high-speed GPIB controller developed by CONTEC (upwardly compatible with the μPD7210), reliable long term availability is ensured.

Diagnostic program

- A diagnostic program is supplied to support system development. The diagnostic program can be used to check hardware operation (interrupts and I/O addresses) and to perform simple communication tests with connected devices.

Other

- A function is provided to read all control lines and data lines. This enables various operations to be performed from the application. [Includes control line latch function.]

Support Software

You should use CONTEC support software according to your purpose and development environment.

NOTE:

This hardware does not support Windows 95 and Windows NT4.0/3.51.

Driver Software Package **API-PAC(W32)** (Bundled)

API-PAC(W32) is the library software that provides the commands for CONTEC hardware products in the form of Windows standard Win32 API functions (DLL). It makes it easy to create high-speed application software taking advantage of the CONTEC hardware using various programming languages that support Win32 API functions, such as Visual Basic and Visual C++.

It can also be used by the installed diagnosis program to check hardware operations.

CONTEC provides download services (at http://www.contec.com/apipac/) to supply the updated drivers and differential files.

For details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.

< Operating environment >

OS	Windows XP, Server 2003, 2000, Me, 98, etc..
Adaptation language	Visual C++ .NET, Visual C# .NET, Visual Basic .NET, Visual C++, Visual Basic, Delphi, C++Builder, etc..

API-GPLV(W32) library supporting LabVIEW (Bundled)

API-GPLV(W32) is a driver created according to the National Instruments Corporation's GPIB function style. The driver is software to control the CONTEC GPIB board (PC Cards) using a LabVIEW-based GPIB system or existing application program.

It can also be used by the installed diagnosis program to check hardware operations.
CONTEC provides download services (at http://www.contec.com/gplv/) to supply the updated drivers and differential files.
For details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.

< Operating environment >

OS	Windows XP, Server 2003, 2000, Me, 98, etc..
Adaptation language	LabVIEW, Visual C++ .NET, Visual C# .NET, Visual Basic .NET, Visual C++, Visual Basic, Delphi, C++Builder, etc..

Linux version of general-purpose count driver: **API-GPIB(LNX)**
(Supplied: Stored on the API-PAC(W32) CD-ROM)

This driver is used to control CONTEC GPIB boards (PC Cards) from within Linux.
You can control CONTEC GPIB boards easily using the shared library called from the user application, the device driver (module) for each kernel version, and the board (PC Cards) configuration program (config).
CONTEC provides download services (at http://www.contec.com/apipac/) to supply the updated drivers and differential files.
For details, read Help on the bundled CD-ROM or visit the CONTEC's Web site.

< Operating environment >

OS	RedHatLinux, TurboLinux, etc.. (For details on supported distributions, refer to Help available after installation.)
Adaptation language	**gcc, etc..**

Cable & Connector (Option)

GPIB cable (2m)	:	PCN-T02
GPIB cable (4m)	:	PCN-T04
GPIB Connector	:	CN-GP/C This is useful if the cable used to connect to the instrument or other device is obstructed by the device's case. See the troubleshooting section at the end of Chapter 2.

* Check the CONTEC's Web site for more information on these options.

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

Web Site

Japanese	http://www.contec.co.jp/
English	http://www.contec.com/
Chinese	http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.

CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information
Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited Three-Years Warranty

CONTEC products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to three years from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original PC Card s. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization Number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Handling Precautions

⚠ DANGER

Do not use the product where it is exposed to flammable or corrosive gas. Doing so may result in an explosion, fire, electric shock, or failure.

⚠ CAUTION

- Mount the PC card in a PC Card Standard CardBus compatible PC card slot.
- Do not strike or bend the PC Card. Doing so could damage the PC Card.
  Otherwise, the PC Card may malfunction, overheat, cause a failure or breakage.
- Do not subject the socket used to connect the cable to the PC card to knocks or other excessive force.
  Otherwise, the PC card may malfunction, overheat, or cause a failure.
- Do not insert or remove the PC card in the card slot when the power is turned on to the PC.
- Do not insert or remove the cable while the power is turned on to the PC.
- Connect the cable to the card before inserting the card into the PC.
  Otherwise, the PC card may malfunction, overheat, or cause a failure.
- Do not try to remove the cable from the connecter on the PC card without pressing the locking spring as this may prevent the cable from being securely connected.
- When you use the PC Card in a noisy environment or are nervous about noise, strengthen the earthing between the PC Card frame and the frame ground of your PC. Specifically, install the PC Card attachment, and then connect the PC Card frame and the frame ground of the PC to earth the PC Card frame (e.g. using an earth cable).
- Ensure that the PC power supply has sufficient capacity for all mounted cards.
  An inadequate power supply may cause misoperation, overheating, or faults.
- The specifications of this product are subject to change without notice for enhancement and quality improvement.
  Even when using the product continuously, be sure to read the manual and understand the contents.
- Do not modify the product. CONTEC will bear no responsibility for any problems, etc., resulting from modifying this product.
- Regardless of the foregoing statements, CONTEC is not liable for any damages whatsoever (including damages for loss of business profits) arising out of the use or inability to use this CONTEC product or the information contained herein.

Environment

Use this product in the following environment. If used in an unauthorized environment, the PC Card may overheat, malfunction, or cause a failure.

Operating temperature

0 - 50°C

Humidity

10 - 90%RH (No condensation)

Corrosive gases

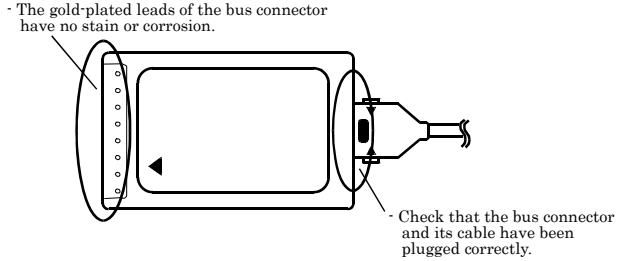
None

Floating dust particles

Not to be excessive

Inspection

Inspect the product periodically as follows to use it safely.


- The gold-plated leads of the bus connector have no stain or corrosion.
- Check that the bus connector and its cable have been plugged correctly.

Storage

When storing this product, keep it in its original packing form.

(1) Put the PC card in the storage bag.

(2) Wrap it in the packing material, then put it in the box.

(3) Store the package at room temperature at a place free from direct sunlight, moisture, shock, vibration, magnetism, and static electricity.

Disposal

When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

2. Setup

This chapter explains how to set up the PC Card .

What is Setup?

Setup means a series of steps to take before the product can be used.

Different steps are required for software and hardware

The setup procedure varies with the OS and applications used.

Using the PC Card under Windows

Using the Driver Library API-PAC(W32)

This section describes the setup procedure to be performed before you can start developing application programs for the PC Card using the bundled CD-ROM “Driver Package API-PAC(W32)”.

Taking the following steps sets up the software and hardware. You can use the diagnosis program later to check whether the software and hardware function normally.

Step 1 Installing the Software

Step 2 Setting the Hardware

Step 3 Installing the Hardware

Step 4 Initializing the Software

Step 5 Checking Operations with the Diagnosis Program

If Setup fails to be performed normally, see the “Setup Troubleshooting” section at the end of this chapter.

Using the PC Card under Windows

Using Software Other than the Driver Library API-PAC(W32)

For setting up software other than API-PAC(W32), refer to the manual for that software. See also the following parts of this manual as required.

This chapter Step 2 Setting the Hardware

This chapter Step 3 Installing the Hardware

Chapter 3 External Connection

Chapter 6 About Hardware

Using the PC Card under an OS Other than Windows

For using the PC Card under an OS other than Windows, see the following parts of this manual.

This chapter Step 2 Setting the Hardware

Chapter 3 External Connection

Chapter 6 About Hardware

Step 1 Installing the Software

This explains how to install the driver library.

Before installing the hardware on the PC, install the driver library from the API-PAC(W32) CD-ROM provided with the PC Card.

The following description assumes the operating system as Windows XP. Although some user interfaces are different depending on the OS used, the basic procedure is the same.

About the driver to be used

Two GPIB communication drivers come with your PC Card: API-GPIB(98/PC) and API-GPLV(W32).

API-GPIB(98/PC) provides a CONTEC proprietary function interface.

API-GPLV(W32) provides a function interface equivalent to that from National Instruments Corporation (hereafter NI), allowing the GPIB488, GPIB488.2, and VISA functions of LabVIEW to be used directly and application programs created for NI PC cards to run without modification.

Selection guide

Given below is a guideline for easily selecting the appropriate driver for the PC Card.

driver to be used	Purpose
API-GPIB(98/PC)	- Used to use CONTEC functions - To make the PC Card operate as fast as possible - To convert (digitize) binary and string data easily
API-GPLV(W32)	- To use existing applications for NI PC Cards - To use LabVIEW - Familiar with NI functions but not with CONTEC functions

Starting the Install Program

(1) **Load the CD-ROM [API-PAC(W32)] on your PC.**

(2) **The API-PAC(W32) Installer window appears automatically.**
If the panel does not appear, run (CD-ROM drive letter):\AUTORUN.exe.

(3) **Click on the [**Install Development or Execution Environment**] button.**

⚠ CAUTION

Before installing the software in Windows XP, Server 2003, 2000, or NT, log in as a user with administrator privileges.

For using API-GPIB(98/PC)xx

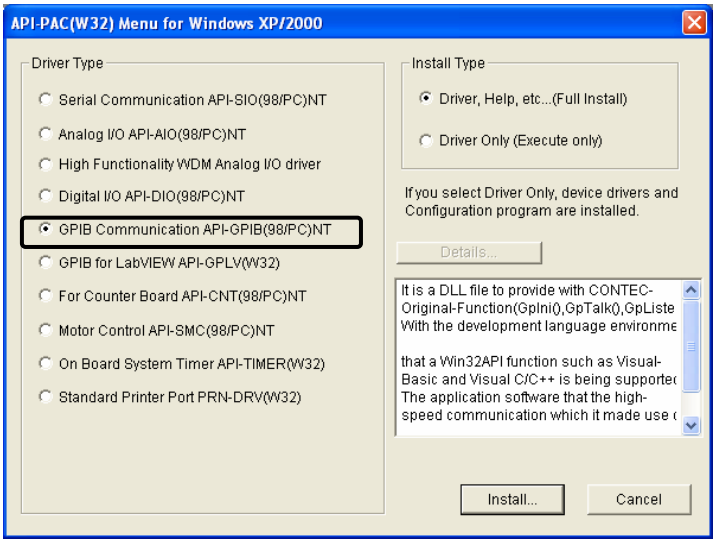
Select API-GPIB(98/PC)

(1) **The following dialog box appears to select “Driver Type” and “Install Type”.**

(2) **Select “GPIB Communication”.**

(3) **Select “Driver, Help, etc..(Full Install)”.**

(4) **Click on the [Install] button.**


API-PAC(W32) Menu for Windows XP/2000
Driver Type
Serial Communication API-SIO(98/PC)NT
Analog I/O API-AIO(98/PC)NT
High Functionality WDM Analog I/O driver
Digital I/O API-DIO(98/PC)NT
GPIB Communication API-GPIB(98/PC)NT
GPIB for LabVIEW API-GPLV(W32)
For Counter Board API-CNT(98/PC)NT
Motor Control API-SMC(98/PC)NT
On Board System Timer API-TIMER(W32)
Standard Printer Port PRN-DRV(W32)
Install Type
Driver, Help, etc...(Full Install)
Driver Only (Execute only)
If you select Driver Only, device drivers and Configuration program are installed.
Details...
It is a DLL file to provide with CONTEC-Original-Function(GpIni(),GpTalk(),GpListe
With the development language environme
that a Win32API function such as Visual-Basic and Visual C/C++ is being supporte
The application software that the high-speed communication which it made use
Install...
Cancel

Executing the Installation

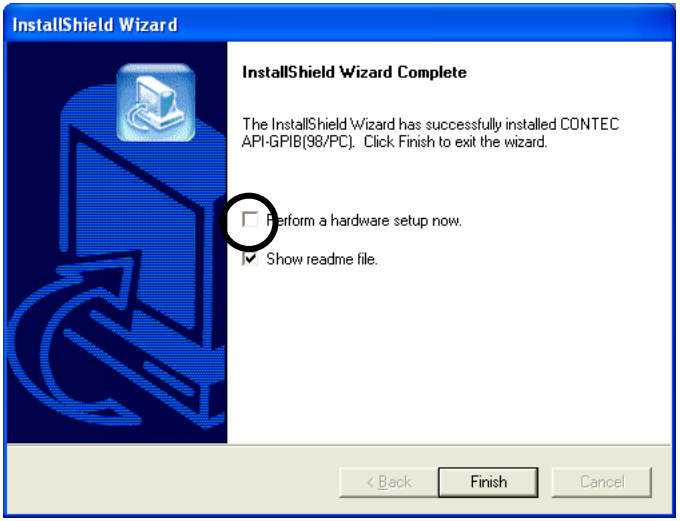
(1) Follow the on-screen instructions to proceed to install.

(2) When the required files have been copied, the “Perform a hardware setup now” and “Show readme file” check boxes are displayed.

When you are installing the software or hardware for the first time:
1) Uncheck “Perform a hardware setup now”.
2) Click on the [Finish] button. Go to Step 2 to set and plug the hardware.

* When the hardware has already been installed:

Check “Perform a hardware setup now”, then go to Step 4 “Initializing the Software”.



You have now finished installing the software.

For using API-GPLV(W32)

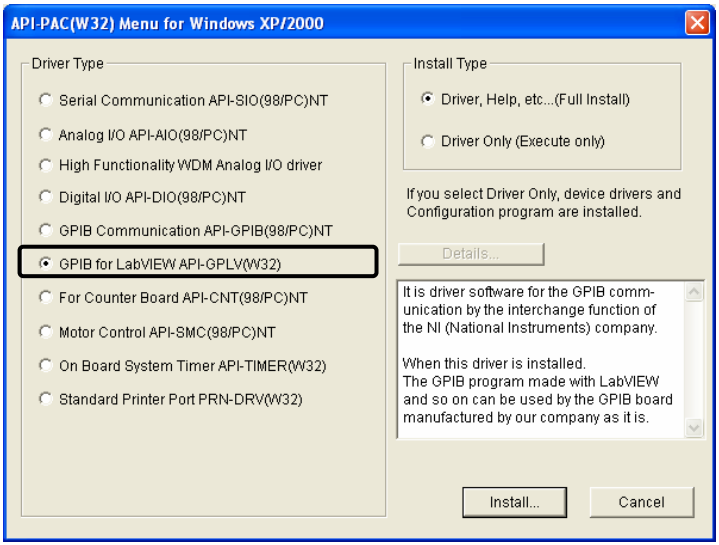
Select API-GPLV(W32)

(1) **The following dialog box appears to select “Driver Type” and “Install Type”.**

(2) **Select “GPIB for LabVIEW API-GPLV(W32)”.**

(3) **Select “Driver, Help, etc..(Full Install)”.**

(4) **Click on the [Install] button.**


API-PAC(W32) Menu for Windows XP/2000
Driver Type
Serial Communication API-SIO(98/PC)NT
Analog I/O API-AIO(98/PC)NT
High Functionality WDM Analog I/O driver
Digital I/O API-DIO(98/PC)NT
GPIB Communication API-GPIB(98/PC)NT
GPIB for LabVIEW API-GPLV(W32)
For Counter Board API-CNT(98/PC)NT
Motor Control API-SMC(98/PC)NT
On Board System Timer API-TIMER(W32)
Standard Printer Port PRN-DRV(W32)
Install Type
Driver, Help, etc...(Full Install)
Driver Only (Execute only)
If you select Driver Only, device drivers and Configuration program are installed.
Details...
It is driver software for the GPIB communication by the interchange function of the NI (National Instruments) company.
When this driver is installed.
The GPIB program made with LabVIEW and so on can be used by the GPIB board manufactured by our company as it is.
Install...
Cancel

Executing the Installation

(1) Follow the on-screen instructions to proceed to install.

(2) The driver installation is completed when the GPIB setup utility is started.
If you are installing the software and hardware for the first time, click on the [Cancel] button in this step to terminate the installation procedure.

* When the hardware has already been installed:
Go to “For Using API-GPLV(W32)” in Step 4 "Initializing the Software".

Step 2 Setting the Hardware

This section explains how to setup the PC card and mount the card in the PC.

Ensure that the PC you are using has a PC Card Standard compliant CardBus Type II PC card slot.

Connecting the PC Card to the Connecter Cable

Plug the PC card connector end of the supplied cable [CB-GPIB] into the PC card.

⚠ CAUTION

- When plugging in the cable, align the cable connector with the PC card socket and push firmly into place. Do not apply any excessive force to the socket on the PC card as this may damage the socket or result in a bad connection.
- Do not insert or remove the cable or PC card while the power is turned on to the PC.

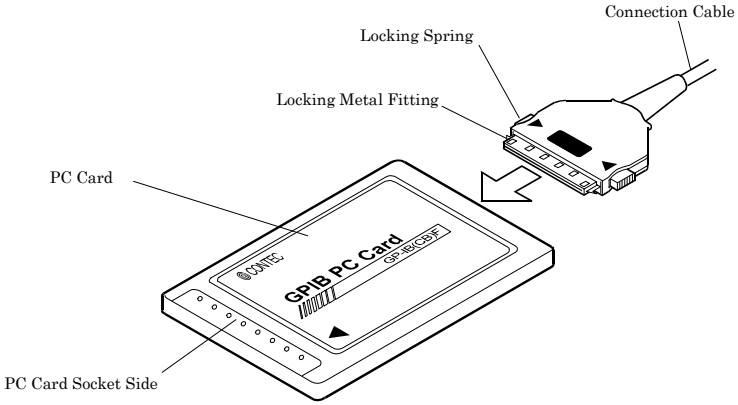


Figure 2.1. Connecting the PC Card to the Connecter Cable

Fitting the PC Card Attachment

Fitting the PC card attachment helps prevent the cable from being disconnected if force is accidentally applied to the top of the connector.
Refer to the instructions supplied with the PC card attachment for details on how to fit it.

⚠ CAUTION

When using other PC cards in the same PC, the PC card attachment may obstruct the other cards and make them difficult to insert. In this case, please remove the PC card attachment.

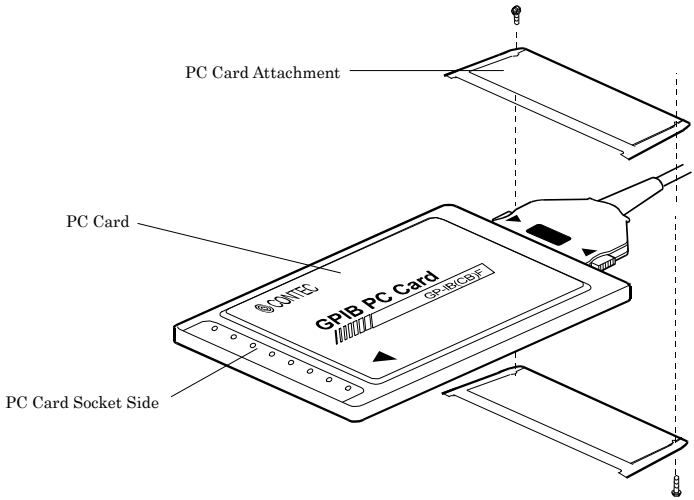


Figure 2.2. Fitting the PC Card Attachment

Insert the PC Card

Check that the power to the PC is turned off and insert the card into the PC card slot on the PC.

Firmly insert the card into the slot with the orientation indicated by the arrow symbol on the card, as shown in Figure 2.3.
The PC card has a key to prevent it from being inserted incorrectly. Do not try to force the card into the slot the wrong way around as this may damage the card or the slot on the PC. Also, check the card slot on your PC as the slots on some PCs are oriented so that cards is inserted with the top side facing down.

Refer to the manual for your PC for instructions on how to remove the card.

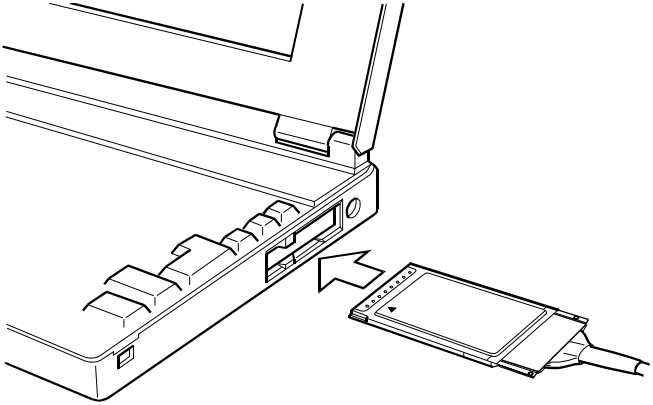


Figure 2.3. Insert the PC Card

⚠ CAUTION

Take note of the following points as inappropriate handling of the PC card may damage the card or connector socket and may result in a bad connection.

- Always insert the PC card with the correct orientation and in accordance with the instructions.
- Do not hold the card by the cable or connector when inserting the card into the slot.
- Do not move the PC with the cable still plugged in.
- Do not apply any excessive force to the cable socket on the PC card such as by pulling on the cable connector.
- Do not place any objects on top of the cable connector.

Step 3 Installing the Hardware

For using an expansion PC card under Windows, you have to let the OS detect the I/O addresses and IRQ to be used by the PC card. The process is referred to as installing the hardware.

In the case of using two or more PC cards, make sure you install one by one with the Found New Hardware Wizard.

Turning on the PC

Turn on the power to your PC.

⚠ CAUTION

- The PC card cannot be properly installed unless the resources (I/O addresses and interrupt level) for the PC card can be allocated. Before attempting to install the PC card, first determine what PC resources are free to use.
- The resources used by each PC card do not depend on the location of the PC card slot or the PC Card itself. If you remove two or more PC cards that have already been installed and then remount one of them on the computer, it is unknown that which one of the sets of resources previously assigned to the two PC cards is assigned to the remounted PC card. In this case, you must check the resource settings.

Setting with the Found New Hardware Wizard

(1) The “Found New Hardware Wizard” will be started.
Select “Install from a list or specific location[Advanced]”, then click on the [Next] button.
If you are using Windows NT 4.0, the “Found New Hardware Wizard” is not started. Go to Step 4 “Initializing the Software”.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Multimedia Controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location [Advanced]
Click Next to continue.
< Back
Next >
Cancel

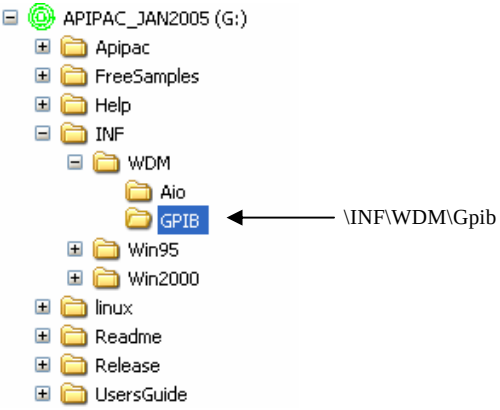
(2) Specify that folder on the CD-ROM which contains the setup information (INF) file to register the PC Card.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
GPIB GP-IB(PCI)F/GP-IB(LPCI)F
Click Finish to close the wizard.
< Back
Finish
Cancel
* The name of the PC card you have just added is displayed.
- GP-IB(CB)F
- GP-IB(CB)FL

Source folder

The setup information (INF) file is contained in the following folder on the bundled CD-ROM.

\INF\WDM\Gpib



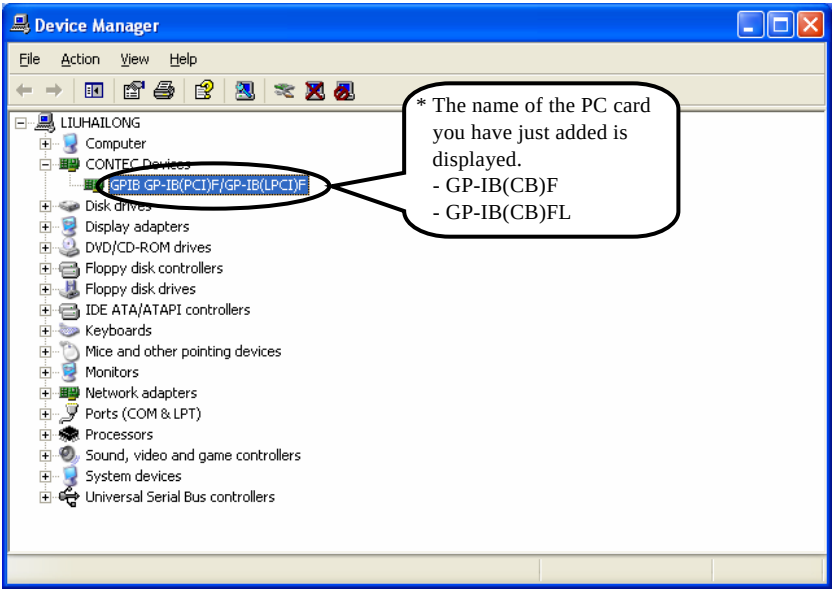
You have now finished installing the hardware

Step 4 Initializing the Software

The driver library requires the initial setting to recognize the execution environment. It is called the initialization of the driver library.

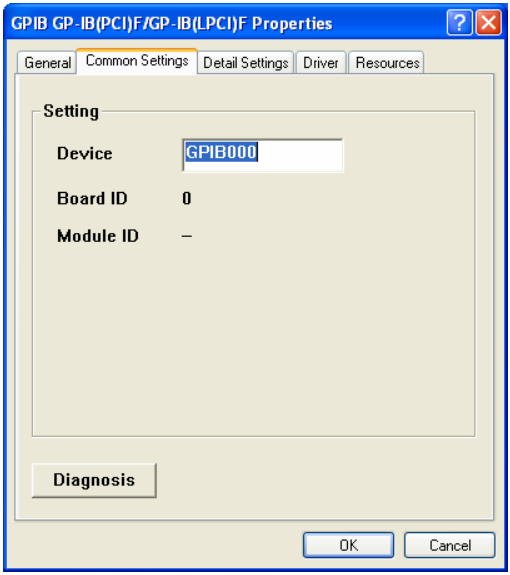
Setting the device name

(1) Start Device Manager. Select [My Computer] - [Control Panel] - [System], then select the [Device Manager] tab.
(Alternatively, right click on My Computer and select Properties.)



(2) The installed hardware appears under the "CONTEC Devices" node in the tree.
Open the device tree and select the device (the selected device appears highlighted).
Click [Properties].

(3) The device property page appears.
Enter the device name in the common settings tab page.



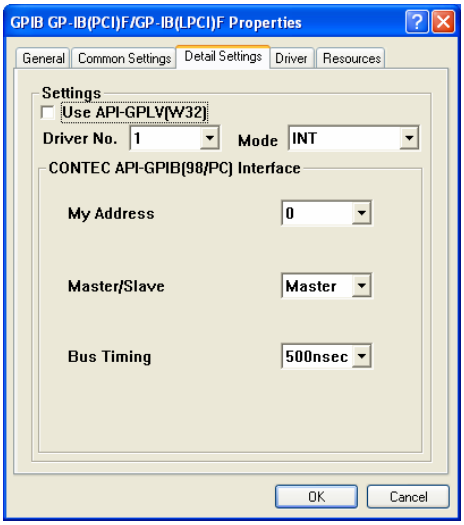
* The device name displayed initially is a default value. You can leave this default name if you wish.

* Ensure that the same device name is not used for more than one device.

For using API-GPIB(98/PC)xx

Advanced settings (for the API-GPIB(98/PC)xx)

(1) Open the advanced settings tab page and specify the settings.
Specify a "Driver No." that is not used by any other CONTEC GPIB PC card. The "Driver No." determines the API routine names to use.



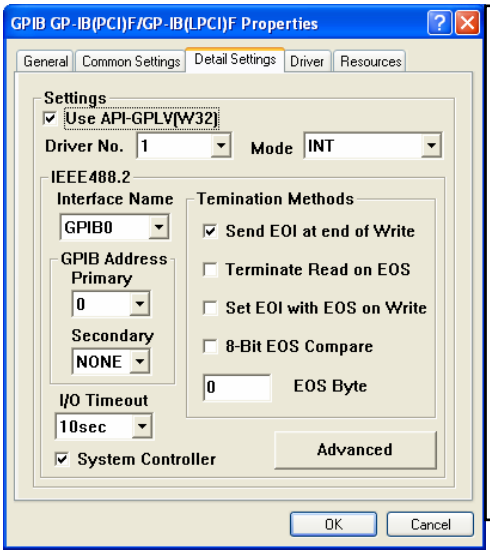
(2) When you have finished, click [OK].

You have now finished installing the initial setting of Software.

For using API-GPLV(W32)

Advanced settings (for the API-GPLV(W32))

(1) Open the advanced settings tab page and specify the settings.
The following window opens if "Use API-GPLV(W32)" is selected.



- Interface Name :
From the list, select the PC Card to be set up.
- GPIB Address :
Set the device address of the PC Card .
The primary address can be set to 0 - 30.
- Termination Methods :
Set the termination format.
- I/O Timeout :
Set the transmit/receive time-out period.
- System Controller :
Select whether to use the PC Card as a system controller.

(2) When you have finished, click [OK].

You have now finished installing the initial setting of Software.

Step 5 Checking Operations with the Diagnosis Program

Use the diagnosis program to check that the PC card and driver software work normally, thereby you can confirm that they have been set up correctly.

What is the Diagnosis Program?

The diagnosis program diagnoses the states of the PC card and driver software.

It can also be used as a simple checker when an external device is actually connected.

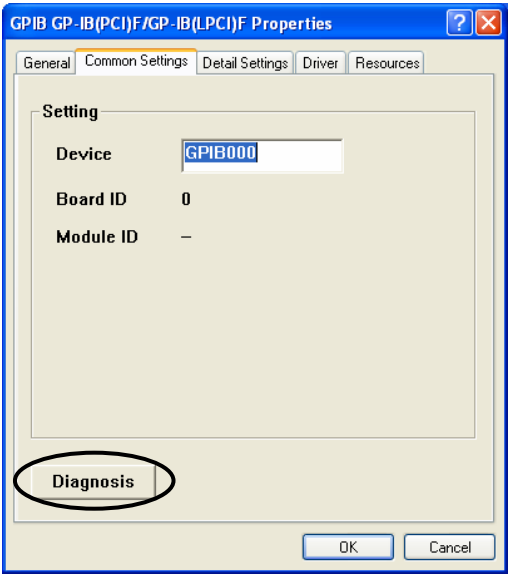
Using the “Diagnosis Report” feature reports the driver settings, the presence or absence of the PC card, I/O status, and interrupt status.

Check Method

Perform the transmit/receive test and check the execution environment with the PC Card connected to the remote device.
Before diagnosis, check the address of the remote device. Prepare the user’s guide and command reference for the remote device as required (to perform testing smoothly).

Starting the Diagnosis Program

Click the [Diagnosis] button on the device property page to start the diagnosis program.

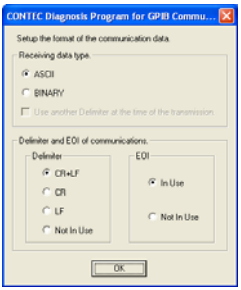


Check of GPIB communication

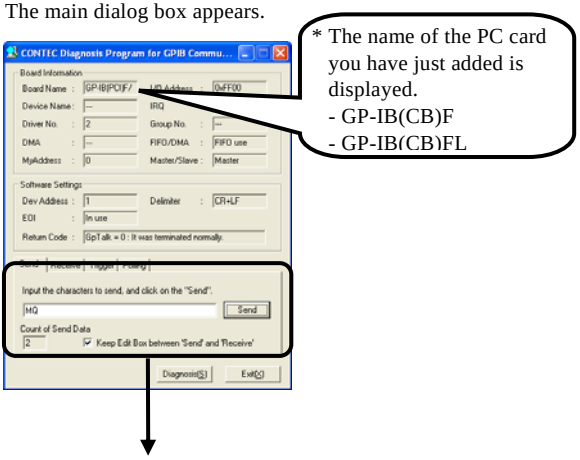
The remote device address setting, communication data format setting, and main dialog boxes are displayed.

(1) Specify the remote device address and click on the [OK] button.

(2) Specify the communication format and click on the [OK] button.



(3) The main dialog box appears.



* The name of the PC card you have just added is displayed.
- GP-IB(CB)F
- GP-IB(CB)FL

The following commands can be used to check GPIB operations.

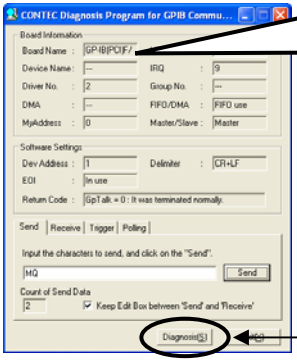
”Send”:	Sends the typed character string with a delimiter to the remote device.
”Receive”:	Receives data from the remote device and displays it along with the number of data items.
”Trigger”:	Sends a trigger command to the remote device.
”Polling”:	Polls the remote device and displays the obtained status byte.

Note

When communication has been completed successfully, “xxxxx completed normally” is displayed as the “return value”.

Diagnosis Report

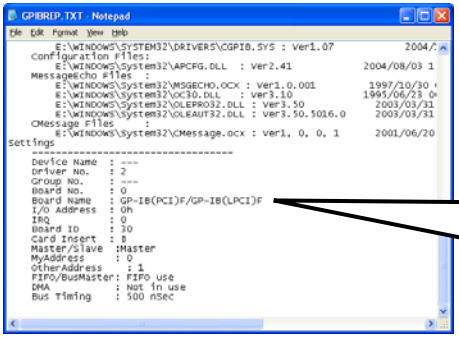
(1) Clicking on [Diagnosis] displays detailed data including PC card settings and the diagnosis results while saving them in text format.
The results are saved and displayed as a text file (GpibRep.txt) in the install folder (Program Files\CONTEC\API-PAC(W32)).
The diagnosis program performs "PC card presence/absence check", "driver file test", "PC card setting test", and so on.



* The name of the PC card you have just added is displayed.
- GP-IB(CB)F
- GP-IB(CB)FL

Click on [Diagnosis].

(2) A diagnosis report is displayed as shown below.



* The name of the PC card you have just added is displayed.
- GP-IB(CB)F
- GP-IB(CB)FL

Setup Troubleshooting

Symptoms and Actions

A GPIB error occurs.

The remote device address may be incorrect or the GPIB cable may not yet be connected.

The OS won't normally get started or detect the PC card.

Turn off the power to the PC and remove the PC card. Reboot the OS and use [Control Panel] - [Add/Remove Applications] to uninstall the "CONTEC API-GPIB(WDM) driver".

Turn off the PC again, plug the PC card, and restart the OS. Let the OS detect the PC card and use API-TOOL Configuration to make PC card settings over again.

If your problem cannot be resolved

Refer to the troubleshooting section of GPIB HELP and API-GPLV HELP.

3. External Connection

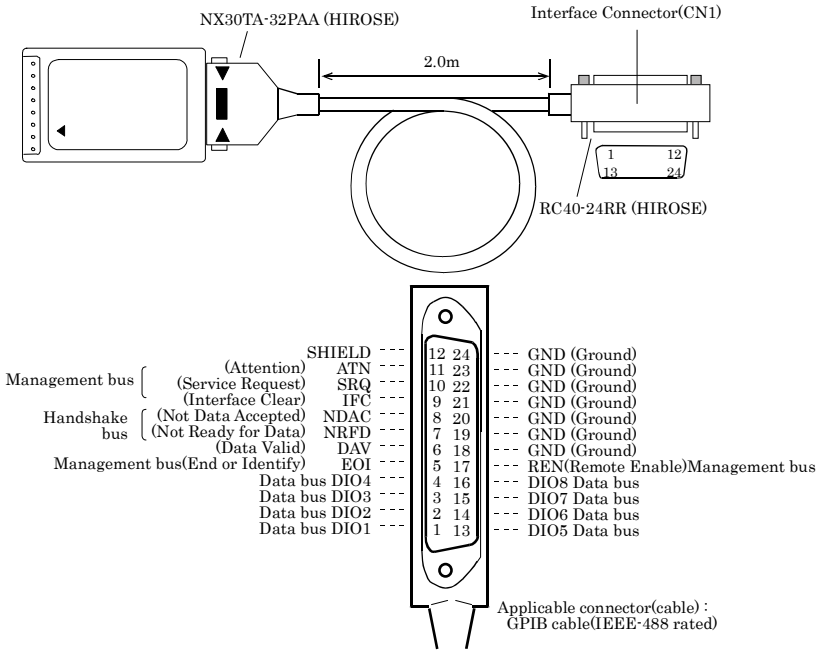
This chapter describes the interface connectors on the PC card.

Check the information available here when connecting an external device.

How to connect the connectors

Connector shape

Use the interface connectors on the CB-GPIB cable to connect to external devices.



* Please refer to chapter 1 for more information on the supported cable and accessories.

Figure 3.1. Cable(CB-GPIB) Shape and Interface Connector Pin Layout

Notes on cable connection

The GPIB has restrictions on the number of devices connected and the cable length according to the standard.

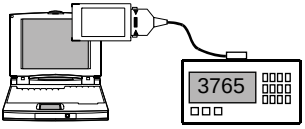
(1) The maximum number of interfaces (external devices) is 15, which can be connected to one system.

(2) The maximum total length of cables that can be used to interconnect a group of devices in one bus system is “2 m x (the number of devices)” or 20 m, whichever is shorter. (JIS C1901-1987).

Note, however, the individual cables between devices must be within 4 m long. Some examples are given below.

- System with a total of two devices
  2 m x (Number of devices = 2) < 20 m

  The maximum total length of cables for this system is therefore 4 m.

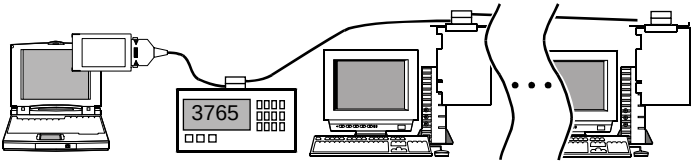


- System with a total of three devices
  2 m x (Number of devices = 3) < 20 m

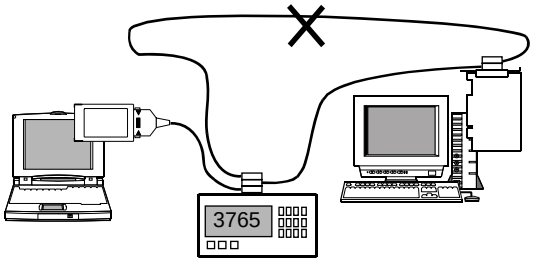
  The maximum total length of cables for this system is therefore 6 m. The two cables used in the system must be [2 m + 4 m] or [2 m + 2 m] in length so that neither is longer than 4 m.

- System with a total of fifteen devices
  2 m x (Number of devices = 15) > 20 m

  The maximum total length of cables for this system is therefore 20 m.



(3) The cables in the system must not form a loop.



(4) Unplug the cable from any device which is left off for some reason such as a fault.

(5) When powering the measurement system, turn on the measuring instrument first and then on the PC.

(6) Neither unplug/plug the cable nor turn on/off the device during communication. Doing so stops the operation or causes an error, resulting in trouble.

(7) The talker and listener must be addressed to talk and to listen, respectively, by the controller before the talker can send messages to the listener.

(8) At least two thirds of all the devices connected must be turned on.

4. Functions

This section describes the functions of the PC card.

Bus Master Function

Bus Master Transfer

The bus master data transfer function uses time when the PCI bus is idle to perform direct DMA transfer of data between the PC card and the application memory space. The application memory space means a static area defined using a normal variable declaration. Under Windows, the application memory space is represented using logical addresses and does not necessarily map on to a continuous physical address space. However, the PC card is able to transfer data consecutively to the discontinuous physical address space. Bus master data transfer can be performed for a maximum 64MBytes physical memory area. The actual memory size able to be used when setting up a data transfer in an application depends on the OS type and the size of memory in the PC.

Basic GPIB Functions

Master/slave function

The PC card can be used as either the master (controller) or slave, depending on a setting in the property page. When used as the master, the PC card can send IFC (InterFace Clear) at any timing and control the REN (Remote ENable) line.

Communication function

The PC card can send and receive data in accordance with the IEEE 488 Standard. You can add delimiters and EOI (End of Identify) to outgoing data depending on the software settings.

Serial poll/parallel poll/SRQ send functions

The following functions can be used depending on the master/slave configuration.

Master

Serial poll

Parallel poll

Slave

Status byte setting

SRQ (Service ReQuest) transmission

Response to parallel polling

My address setting

The GPIB address (my address) of the PC card can be set by API-TOOL Configuration (API-GPIB(98/PC)xx) or Configuration Utility (API-GPLV(W32)). No setting is required on the PC card.

Additional Functions

Line monitor function

The states of all control lines (IFC, ATN, SRQ, REN, EOI, DAV, NRFD, and NDAC) can be read. The latch data can also be read. You can also read the current state of the data lines (DIO1 to DIO8).

Communication using FIFO memory

The PC card can use on-board FIFO memory for communication. As the PC card controls this form of communication, it can be performed at high speed irrelevant to the PC's CPU speed.

Note, however, that the actual communication speed is set to the speed of the slowest device in compliance with the GPIB standard.

Analyzer function (GP-IB(CB)F)

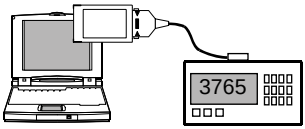
The state transition of all lines in the GPIB cable can be analyzed by using the on-PC Card FIFO memory. (A maximum of 64K data items can be collected.)
This function can be used to locate the cause of a failure or to check data flowing on lines.
The function is provided by the analyzer utility (Analyzer.exe).
Open the Start Menu, then select "CONTEC API-PAC(W32)" – "GPIB" – "GPIB ANALYZER".
Otherwise, directly execute "Program Files\API-PAC(W32)\GPIB\ANALYZER\Analyzer.exe".

Running Method

(1) Install the PC card on your PC according to Step 2 "Setting the Hardware" and Step 3 "Installing the Hardware" in Chapter 2 "Setup".

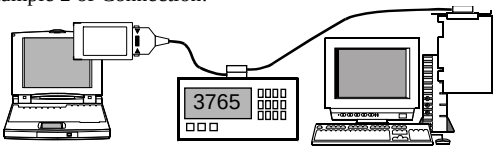
After having installed the PC card, connect the PC Card to an instrument for analysis. The PC card can communicate with the instrument while executing analysis.

Example 1 of Connection:



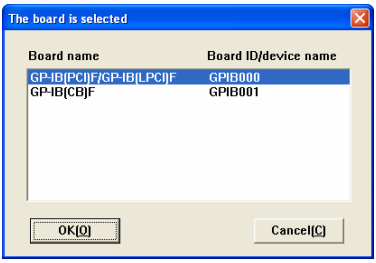
One PC Card communicating the instrument while analyzing

Example 2 of Connection:

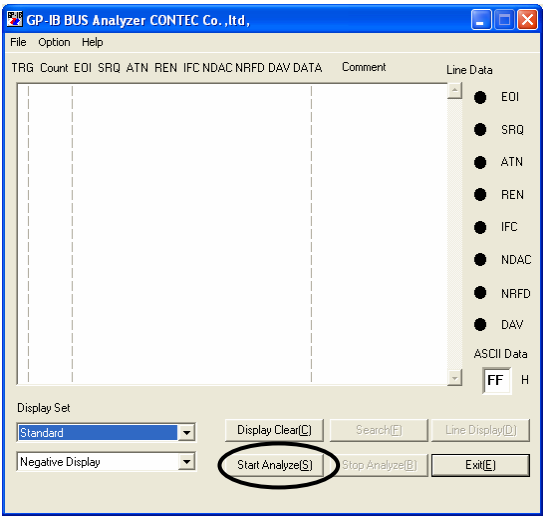


PC1: Only the analyzer is executed.
PC2: Communicating with the measuring instrument

(2) If more than one PC Card (device) that supports the analyzer function is installed in the PC, the following window appears when you start the analyzer utility. Select the device name set for the hardware in the property page, then click [Select Board]. (This window does not appear if only one PC Card is present that supports the analyzer function.)



(3) Click on the [Start Analyze] button. The analyzer utility analyzes the subsequent changes to lines. When the communication you want to analyze has been completed, click on the [Stop Analyze] button. The analysis results will be displayed on the screen.

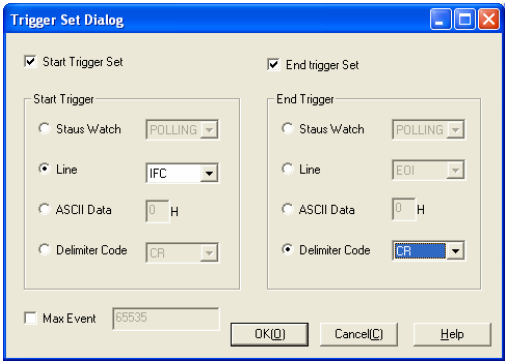


Convenient usage

(1) Using the start and end triggers

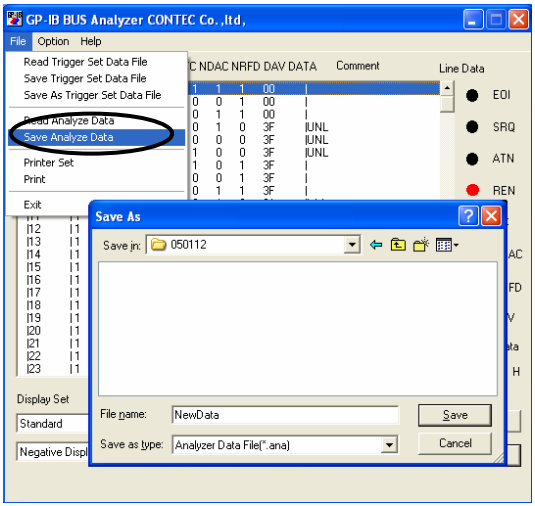
During analysis, the analyzer utility can obtain data only when a specific condition is satisfied in the entire session of communication. The condition that can be specified is a communication status (polling, transmit/receive, etc.), a change to the control line (EOL, SRQ, ATN, etc.), a data line match (specified ASCII code), or a delimiter match.
Select “Set Trigger Condition” from the “Set” menu.
The analyzer utility works as follows with the settings made on the Trigger Set Dialog below.

- The analyzer utility starts analysis the moment IFC changes.
- The analyzer utility ends analysis upon transmit/receive of data “CR” (0DH).



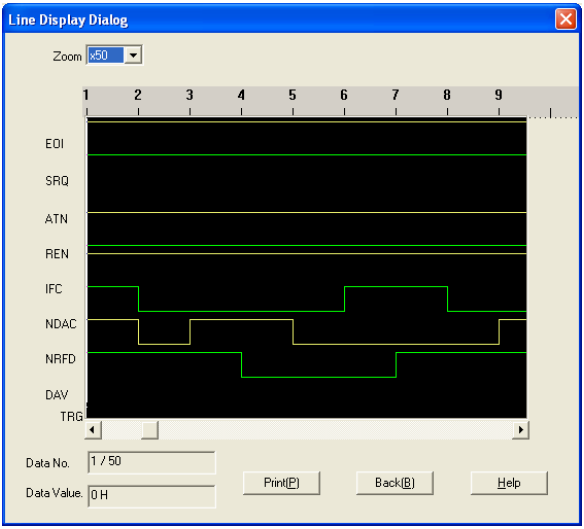
(2) Saving analysis data

Once saved, obtained analysis data can be opened again with the analyzer utility. Since analysis data is saved in CSV format as well, you can reference and edit the data using a proper program such as Excel.



(3) Viewing analysis data in a chart

The analysis utility can display analysis data in a chart.



5. About Software

CD-ROM Directory Structure

```
\
|– Autorun.exe          Installer Main Window
| Readmej.html          Version information on each API-TOOL (Japanese)
| Readmeu.html          Version information on each API-TOOL (English)
   .
   .
|——APIPAC               Windows driver file
|    |—AIO
|    |   |—DISK1
|    |   |—DISK2
|    |   |—……
|    |   |—DISKN
|    |—AioWdm
|    |—CNT
|    |—DIO
|    |—……
   .
   .
| —HELP                 HELP file
|    |—Aio
|    |—Cnt
|    |—……
   .
   .
| —INF                  Each INF file for OS
|    |—WDM
|    |—Win2000
|    |—Win95
   .
   .
|—linux                 Linux driver file
|    |—cnt
|    |—dio
|    |—……
   .
   .
| —Readme               Readme file for each driver
   .
   .
| —Release              Driver file on each API-TOOL
|    |—API_NT           (For creation of a user-specific install program)
|    |—API_W95
   .
   .
| —UsersGuide           Hardware User's Guide(PDF files)
```

About Software for Windows

The bundled CD-ROM “Driver library API-PAC(W32)” contains the functions that provide the following features:

- All of the master mode, slave mode, and interrupt level can be set by software.
- Three-wire handshaking is employed to assure transfer even between the sending and receiving devices different in speed.

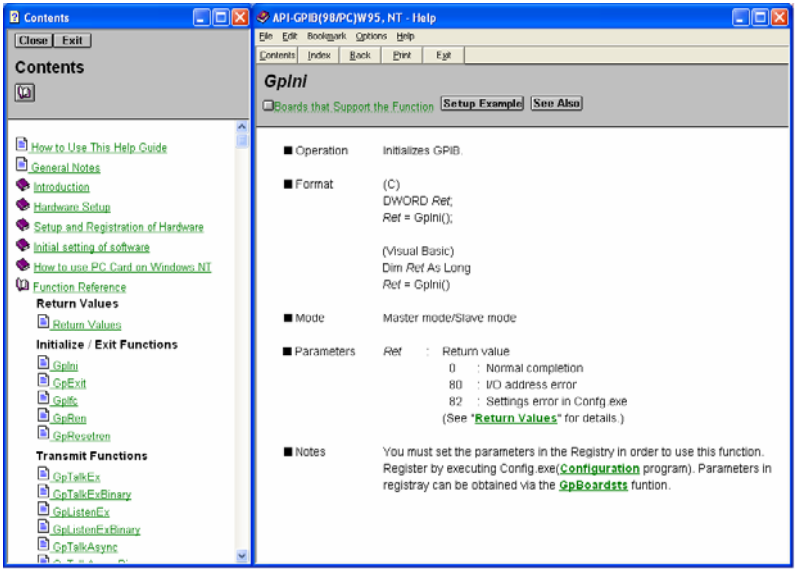
For details, refer to the help file. The help file provides various items of information such as “Function Reference”, “Sample Programs”, and “FAQs”. Use them for program development and troubleshooting.

For using API-GPIB(98/PC)xx

Accessing the Help File

(1) Click on the [Start] button on the Windows taskbar.

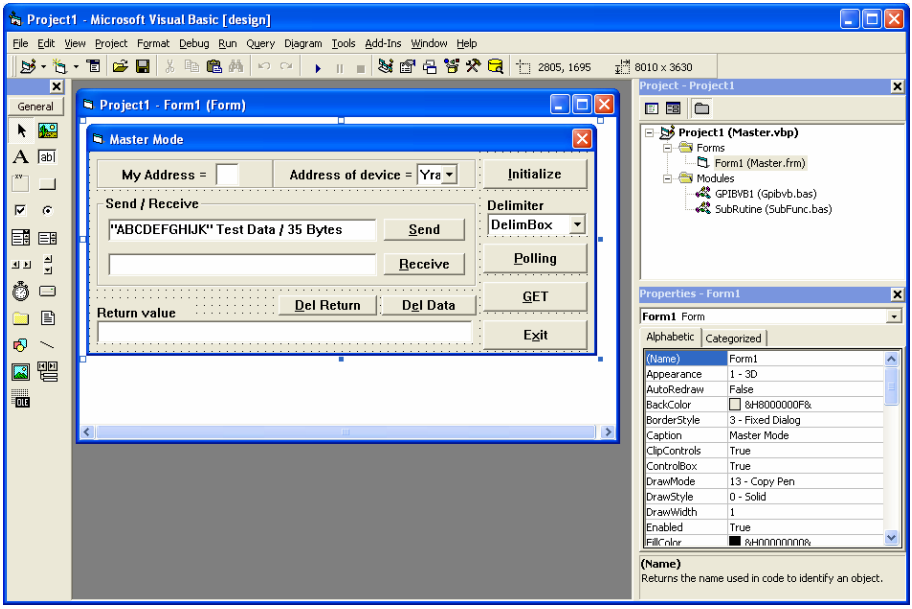
(2) From the Start Menu, select “Programs” – “CONTEC API-PAC(W32)” – “GPIB” – “API-GPIB HELP” to display help information.



Using Sample Programs

Bundled sample programs cover basic transmit/receive and polling in master and slave modes and support ADVANTEST Multimeters, YEW voltage generators, and SONY Tektronix oscilloscopes.

Use these sample programs as references for program development and operation check.



Running a Sample Program

(1) Click on the [Start] button on the Windows taskbar.

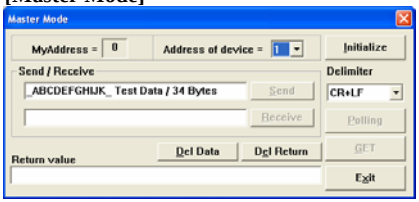
(2) From the Start Menu, select “Programs” – “CONTEC API-PAC(W32)” – “GPIB” – “SAMPLE…”.

(3) A sample program is invoked.

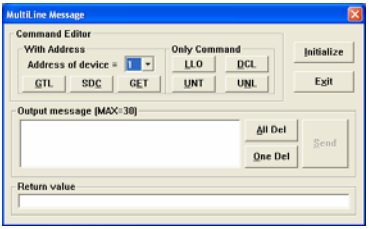
Sample Programs - Examples

-Master Mode	:	Executes a series of operations in master mode.
-Slave Mode	:	Executes a series of operations in slave mode.
-Multi-meter	:	Triggers a multimeter periodically (based on the timer and events) to sample and display data.
-Voltage Source control	:	Allows the master to gain control of a digital voltmeter at fixed intervals.
-Oscilloscope 1	:	Receives screen data from an oscilloscope and displays it in a graph.
-Oscilloscope 2	:	Receives screen data from an oscilloscope and saves it in CSV format.
-MultiLine Message	:	Creates a multiline message for the remote device.

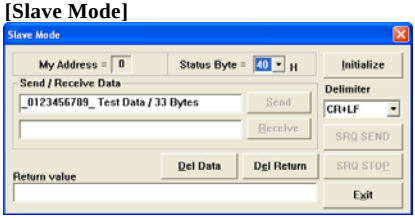
[Master Mode]



[MultiLine Message]

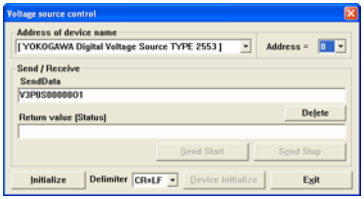


[Slave Mode]



[Oscilloscope 2]

[Voltage Source control]



For using API-GPLV(W32)

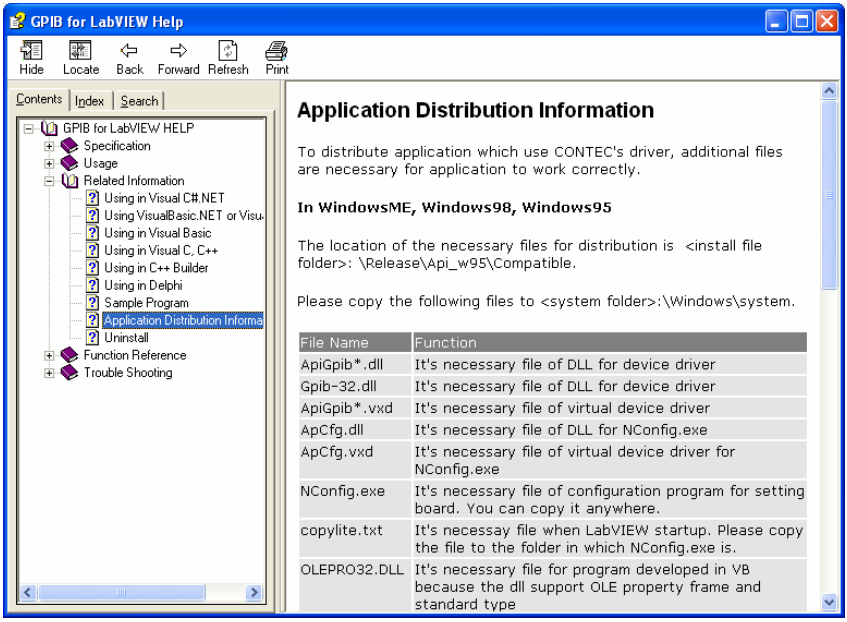
API-GPLV(W32) is a driver created in NI's GPIB function style as the software for controlling CONTEC GPIB PC cards.

When the driver is installed, existing applications such as LabVIEW can operate CONTEC GPIB PC cards. For details, refer to the help file. The help file provides information such as "operation specifications", "additional information", and "troubleshooting".

Accessing the Help File

(1) Click on the [Start] button on the Windows taskbar.

(2) From the Start Menu, select "Programs" – "CONTEC API-PAC(W32)" – "GPLV" – "API-GPLV HELP" to display help information.


GPIB for LabVIEW Help
Hide
Locate
Back
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Application Distribution Information
To distribute application which use CONTEC's driver, additional files are necessary for application to work correctly.
In WindowsME, Windows98, Windows95
The location of the necessary files for distribution is <install file folder>: \Release\Api_w95\Compatible.
Please copy the following files to <system folder>:\Windows\system.
File Name
Function
ApiGpib*.dll
It's necessary file of DLL for device driver
Gpib-32.dll
It's necessary file of DLL for device driver
ApiGpib*.vxd
It's necessary file of virtual device driver
ApCfg.dll
It's necessary file of DLL for NConfig.exe
ApCfg.vxd
It's necessary file of virtual device driver for NConfig.exe
NConfig.exe
It's necessary file of configuration program for setting board. You can copy it anywhere.
copylite.txt
It's necessay file when LabVIEW startup. Please copy the file to the folder in which NConfig.exe is.
OLEPRO32.DLL
It's necessary file for program developed in VB because the dll support OLE property frame and standard type

Function List

Up to now the NI-488.2 PC Card -Level Calls

Function Name	Action Outline
ibask	Return information about software configuration parameters.
ibcac	Become Active Controller.
ibcmd	Send GPIB commands.
ibcmda	Send GPIB commands asynchronously.
ibconfig	Change the software configuration parameters.
ibdma	Enable or disable DMA.
ibeos	Configure the end-of-string (EOS) termination mode or character.
ibeot	Enable/disable auto-assertion of GPIB EOI line at the end of write.
ibfind	Open and initialize a GPIB board.
ibgts	Go from Active Controller to Standby.
ibist	Set or clear the board individual status bit for parallel polls.
iblines	Return the status of the eight GPIB control lines.
ibln	Check for the presence of a device on the bus.
ibloc	Go to local.
ibnotify	Asynchronously notify user when one or more GPIB events occur.
ibonl	Place the device online or offline.
ibpad	Change the primary address.
ibppc	Parallel poll configure.
ibrd	Read data from a device into a user buffer.
ibrda	Read data asynchronously from a device into a user buffer.
ibrdf	Read data from a device into a file.
ibrpp	Conduct a parallel poll.
ibrsc	Request or release system control.
ibrsv	Request service and change the serial poll status byte.
ibsad	Change or disable the secondary address.
ibsic	Assert IFC (Interface Clear).
ibsre	Set or clear the Remote Enable (REN) line.
ibstop	Abort asynchronous I/O operation.
ibtmo	Change or disable the I/O timeout period.
ibwait	Wait for GPIB events.
ibwrt	Write data to a device from a user buffer.
ibwrta	Write data asynchronously to a device from a user buffer.
ibwrtf	Write data to a device from a file.

Up to now the Ni-488.2 Device-Level Calls

Function Name	Action Outline
ibask	Return information about software configuration parameters.
ibbna	Change the access board of a device.
ibclr	Clear a specific device.
ibconfig	Change the software configuration parameters.
ibdev	Open and initialize a device
ibeos	Configure the end-of-string (EOS) termination mode or character.
ibeot	Enable/disable auto-assertion of GPIB EOI line at the end of write.
ibln	Check for the presence of a device on the bus.
ibloc	Go to local.
ibnotify	Asynchronously notify user when one or more GPIB events occur.
ibonl	Place the device online or offline.
ibpad	Change the primary address.
ibpct	Pass control to another GPIB device with Controller capability.
ibppc	Parallel poll configure.
ibrd	Read data from a device into a user buffer.
ibrda	Read data asynchronously from a device into a user buffer.
ibrdf	Read data from a device into a file.
ibrpp	Conduct a parallel poll.
ibrsp	Conduct a serial poll.
ibsad	Change or disable the secondary address.
ibstop	Abort asynchronous I/O operation.
ibtmo	Change or disable the I/O timeout period.
ibtrg	Trigger selected device.
ibwait	Wait for GPIB events.
ibwrt	Write data to a device from a user buffer.
ibwrta	Write data asynchronously to a device from a user buffer.
ibwrtf	Write data to a device from a file.

NI-488.2 Calls for Multiple Devices

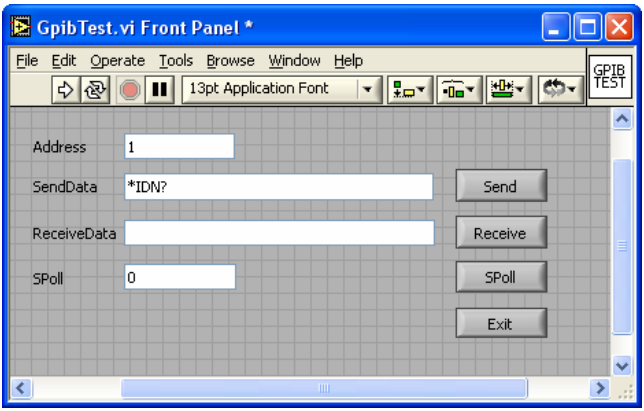
Function Name	Action Outline
AllSpoll	Serial poll all devices.
DevClear	Clear a single device.
DevClearList	Clear multiple devices.
EnableLocal	Enable operations from the front panel of deceives (leave remote programming mode).
EnableRemote	Enable remote GPIB programming for devices.
FindListn	Find listening devices on the GPIB.
FindRQS	Determine which device is requesting service.
PassControl	Pass control to another device with Controller capability.
PPoll	Perform a parallel poll on the GPIB.
PPollConfig	Configure a device to respond to parallel polls.
PPollUnconfig	Unconfigure devices for parallel polls.
RcvRespMsg	Read data bytes from a device that is already addressed to talk.
ReadStatusByte	Serial poll a single device.
Receive	Read data bytes from a device.
ReceiveSetup	Address a device to be a Talker and the interface board to be a Listener in preparation for RcvRespMsg.
ResetSys	Reset and initialize IEEE 488.2-compliant devices.
Send	Send data bytes to a device.
SendCmds	Send GPIB command bytes.
SendDataBytes	Send data bytes to devices that are already addressed to listen.
SendIFC	Reset the GPIB by sending interface clear.
SendList	Send data bytes to multiple GPIB devices.
SendLLO	Send the Local Lockout (LLO) message to all devices.
SendSetup	Set up devices to receive data in preparation for SendDataBytes.
SetRWLS	Place devices in Remote With Lockout State.
TestSRQ	Determine the current state of the GPIB Service Request (SRQ) line.
TestSys	Cause IEEE 488.2-compliant devices to conduct self-test.
Trigger	Trigger a device.
TriggerList	Trigger multiple devices.
WaitSRQ	Wait until a device asserts the GPIB Service Request (SRQ) line.

Using Sample Programs

Sample programs can execute basic transmit/receive and polling.

Use these sample programs as references for program development and operation check.

The sample programs are stored in \Program Files\CONTEC\API-PAC(W32)\GPLV\Samples.



Running a Sample Program

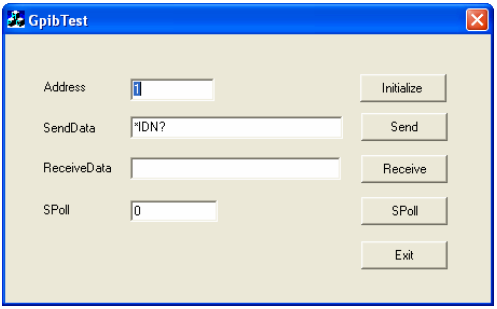
(1) Click on the [Start] button on the Windows taskbar.

(2) From the Start Menu, select “Programs” – “CONTEC API-PAC(W32)” – “GPLV” – “SAMPLE GPLV”.

(3) A sample program is invoked.

Program example

-GpibTest : Executes initialization, transmission, reception, and polling.



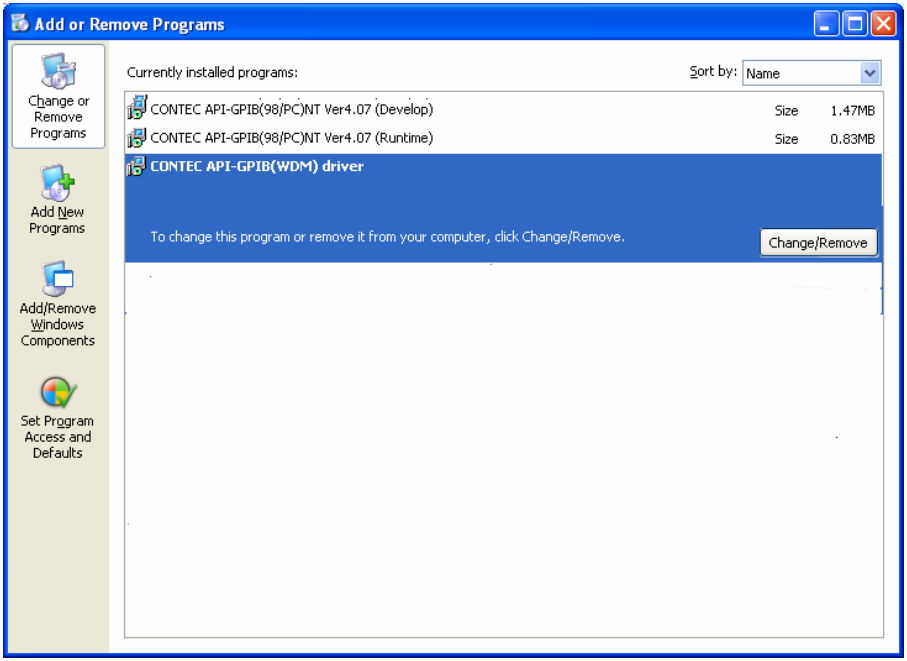
Uninstalling the API Function Libraries

To uninstall API-PAC(W32), follow the procedure below.

(1) Click on the [Start] button on the Windows taskbar. From the Start Menu, select “Settings” – “Control Panel”.

(2) Double-click on “Add/Remove Programs” in the Control Panel.

(3) Select “CONTEC API-GPIB(WDM) driver” , “CONTEC API-GPIB(98/PC)xx” or “CONTEC API-GPLV(W32) xx”. [Change/Remove] button.
Follow the on-screen instructions to uninstall the function libraries.



About Software for Linux

The Linux version GPIB communication driver API-GPIB(LNX) contains the functions that provide the following features:

- All of the master mode, slave mode, and interrupt level can be set by software.
- Three-wire handshaking is employed to assure transfer even between the sending and receiving devices different in speed.

For details, refer to the help file. The help file provides various items of information such as “Function Reference”, “Sample Programs”, and “FAQs”. Use them for program development and troubleshooting.

Driver Software Install Procedure

The Linux version for GPIB communication driver, API-GPIB(LNX), is supplied as a compressed file /linux/gpib/cgpibXXX.tgz on the bundled API-PAC(W32)CD-ROM. (Note: XXX represents the driver version.)

Mount the CD-ROM as shown below, copy the file to an arbitrary directory, and decompress the file to install the driver.

For details on using the driver, refer to readme.txt and the help file in HTML format extracted by installation.

To install the driver, log in as a superuser.

Decompression and setup procedure

```
# cd
 # mount /dev/cdrom /mnt/cdrom              Mount the CD-ROM.
 # cp /mnt/cdrom/linux/gpib/cgpibXXX.tgz ./ Copy the compressed file.
 # tar xvfz cgpibXXX.tgz                    Decompress the compressed file.
 ................
 # cd contec/cgpib
 # make                                     Compile the file.
 ................
 # make install                             Install.
 ................
 # cd config
 # ./config                                 Set up the board to be used.
..... Set as follows .........
 # ./contec_gpib_start.sh                   Start the driver.
# cd
```

Accessing the Help File

(1) Invoke a web browser in your X-Window environment.

(2) In the browser, open gpibhelp.htm in the contec/cgpib/help directory.

Using Sample Programs

Sample programs have been prepared for specific basic applications.

Sample programs for each language are contained in the contec/cgpib/samples directory. For compiling them, refer to the manual for the desired language.

Uninstalling the driver

To uninstall the driver, use the uninstall shell script contained in the contec/cgpib directory. For details, check the contents of the script.

6. About Hardware

This chapter provides hardware specifications and hardware-related supplementary information.

For detailed technical information

For further detailed technical information (“Technical Reference” including the information such as an I/O map, configuration register, etc.), visit the Contec's web site (http://www.contec.com/support/) to call for it.

Hardware specification

The following tables list the hardware specifications of the board.

GP-IB(CB)F

Table 6.1. Specification <GP-IB(CB)F> *< 1 / 2 >*

Item		Specifications
GPIB		
	Number of channel	1ch Conforms to IEEE-488.1, 488.2(GPIB)standards
	Transfer format	8-bit parallel, 3-wire handshake system
	Transfer rate	1.5Mbyte/sec
	Data buffer size	2Kbyte send, 2Kbyte receive
	Signal logic	Negative logic L level : 0.8V or less, H level : 2.0V or more
	Cable length between device	4m or less *1
	Total cable length	20m or less
	Connectable number of device	15 devices (Max.)
	Analyzer buffer size	64K data points (1 data point: Control signals + DIO1 to 8)
Bus master section		
	DMA channels	2ch
	Transfer bus width	32-bit
	Transfer data length	8 PCI Words length (Max.)
	Transfer rate	80Mbyte/sec
	Scatter/Gather function	64Mbyte/ch

Table 6.1. Specification <GP-IB(CB)F> *< 2 / 2 >*

Item		Specifications
Common section		
	I/O address	Any 128-byte boundary
	Interrupt	1 level use
	Consumed current	3.3VDC 400mA (Max.)
	Operating conditions	0 - 50°C, 10 - 90%RH (No condensation)
	Length of supplied cable	2.0m
	PC card slot specifications	PC Card Standard CardBus
	Card size	TYPE II
	Weight	40g (250g including cable)

*1 For details, see item (2) in Chapter3, "Connecting Cables".

GP-IB(CB)FL

Table 6.2. Specification <GP-IB(CB)FL> *< 1 / 2 >*

Item		Specifications
GPIB		
	Number of channel	1ch Conforms to IEEE-488.1, 488.2(GPIB)standards
	Transfer format	8-bit parallel, 3-wire handshake system
	Transfer rate	1.5Mbyte/sec
	Data buffer size	2Kbyte send, 2Kbyte receive
	Signal logic	Negative logic L level : 0.8V or less, H level : 2.0V or more
	Cable length between device	4m or less *1
	Total cable length	20m or less
	Connectable number of device	15 devices (Max.)
Bus master section		
	DMA channels	2ch
	Transfer bus width	32-bit
	Transfer data length	8 PCI Words length (Max.)
	Transfer rate	80Mbyte/sec
	Scatter/Gather function	64Mbyte/ch

Table 6.2. Specification <GP-IB(CB)FL> *< 2 / 2 >*

Item		Specifications
Common section		
	I/O address	Any 128-byte boundary
	Interrupt	1 level use
	Consumed current	3.3VDC 400mA (Max.)
	Operating conditions	0 - 50°C, 10 - 90%RH (No condensation)
	Length of supplied cable	2.0m
	PC card slot specifications	PC Card Standard CardBus
	Card size	TYPE II
	Weight	40g (250g including cable)

*1 For details, see item (2) in Chapter3, "Connecting Cables".

External dimensions

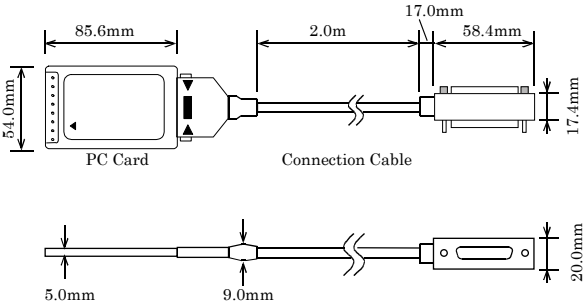


Table 6.3. Interface function

Code	Function
SH1	Source handshake functions
AH1	Acceptor handshake functions
T6	Basic talker, serial polling, MLA talker release
L4	Basic listener MTA listener release
TE0	No extended talker functions
LE0	No extended listener functions
SR1	Service request function
RL1	Remote function
DC1	Device clear function
DT1	Device trigger function
PP1	Configuration by remote message
C1	System controller function
C2	IFC send, controller in-charge
C3	REN send
C4	Response to SRQ
C26	Interface message send, parallel polling

GP-IB(CB)F
GP-IB(CB)FL
User's Manual

CONTEC CO., LTD.
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Japanese http://www.contec.co.jp/
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